R·I·T

Title: Tencor SpectraMap

SM300

Semiconductor & Microsystems

Fabrication Laboratory **Revision: B** **Rev Date: 07/30/2014**

Approved by:

_____ / / _____ / /

Process Engineer Equipment Engineer

1 SCOPE

The purpose of this document is to detail the use of the Tencor SpectraMap SM300. All users are expected to have read and understood this document. It is not a substitute for in-person training on the system and is not sufficient to qualify a user on the system. Failure to follow guidelines in this document may result in loss of privileges.

2 REFERENCE DOCUMENTS

- SpectraMap Users Guide

3 DEFINITIONS

n/a

4 TOOLS AND MATERIALS

4.1 General Description

4.1.1 The SpectraMap SM300 is a film thickness measurement tool that can map an entire wafer. The autoloader is not currently being used and wafers should be loaded manually. The tool is capable of measuring multiple layer films if the thicknesses of the lower films are known. It is also possible to measure the thickness of a film that has been deposited on aluminum or chrome.

5 SAFETY PRECAUTIONS

5.1 Hazards to the operator

5.1.1 This equipment has moving parts that could create pinch hazards.
5.1.2 The SM300 should not be operated with the covers off due to hazardous voltages.

5.2 Hazards to the tool

5.2.1 This tool is intended for wafers only. Do not use other substrates.
5.2.2 Do not place anything on top of the machine that may interfere with operation.
5.2.3 Only clean substrates should be loaded into this tool.
5.2.4 Do not save un-necessary files or recipes due to storage constraints.

6 INSTRUCTIONS

6.1 Initial State Check

6.1.1 Verify that the computer and monitor are both on.

6.2 Resetting the System

6.2.1 The system may be reset by re-booting the computer.

6.3 Operating the system

6.3.1 Making a Measurement

6.3.1.1 Bring up the **Introduction Screen** by pressing the **F8** button on the keyboard (should say **SpectraMap SM300** at top). The menu at the bottom of the screen corresponds to the Function Keys on the keyboard. Press **F1 Folder Select** to display the **Operations Mode Folder Select Screen**.

6.3.1.2 This screen is organized into Cabinets, Drawers and Folders. Various projects will be organized under Cabinets, Drawers will be used for a particular film type and folders will be for test setups. The SMFL cabinet has programs that anyone may use but should not change.

6.3.1.3 Select the appropriate Cabinet, Drawer and Folder for the test that you want to perform.

6.3.1.4 Use the mouse to select **Collect New Data** from the bottom of the screen or just hit **F1**.

6.3.1.5 Press **F1 Load Wafer**. The chuck will orient and rise so that a wafer may be loaded. Make sure that your wafer is centered and oriented properly within the rings on the chuck.

6.3.1.6 After loading your wafer, press **F1 Continue** to start the measurement.

6.3.1.4 When the measurement has finished, the wafer cover will open and the chuck will rise so that the wafer may be removed. The cover will close by itself after a length of inactivity.

6.3.1.5 To save your data select **F7 Save** and see the next section on how to retrieve data. Do *not* save the data unless you need it since there is limited space.

6.3.1.6 To measure another wafer with the same recipe press **F6 New Test** on the keyboard, load the wafer, press **F1** to start the test and then **F1** again to exit without saving.

6.3.1.7 When finished press **F8 Folder Select** to return to the previous menu and **F1 Yes** to exit without saving.

6.3.2 Image Capture

6.3.3 Retrieving the Data

6.3.2.1 Raw data can be saved to a 4.0GB USB thumb drive or smaller in ASCII format.

6.3.2.2 Insert a 4.0GB USB thumb drive or smaller into the USB slot on the computer.

6.3.2.3 From **FOLDER SELECT** go to **INTRO** and then **SETUP.**

6.3.2.4 From the **Main Engineering Menu**, (should say **Menu** and **Item** in the center of the screen) highlight **File Operations** in the menu box on the left. Select **ASCII Copy to Disk** in the **Item** box on the right.

6.3.2.5 Press **F1 select** to display the **ASCII Folder Select** Screen.
6.3.2.6 Select the folder where your data is and press **F1 select**.
6.3.2.7 Select the file that you want to save with the arrow keys and press the **F3 Select** button and press **F7** to start.
6.3.2.8 Press **F1** to continue.
6.3.2.9 The data may be viewed by opening the file in Excel.
6.3.2.10 Data will be deleted quarterly by staff.

6.3.3 Setting up new Cabinets, Drawers and Folders

6.3.3.1 From the **Main Engineering** menu select **Test Development** from the menu box.
6.3.3.2 Select **Test Setup** from the **Item** box.
6.3.3.3 Press **F1** select to display the **Folder Select** screen.
6.3.3.4 To create new Cabinets, Drawers and Folders, use the mouse to select a blank spot and then type in an appropriate name. Hit Enter after each entry and **F5 Update** when done.

6.3.4 Setting up new Tests

6.3.4.1 From the **Engineering Folder Select** screen, highlight a folder and press **F1** select.
6.3.4.2 Under **Card Index** select **Test Setup**.
6.3.4.3 Some index cards will be displayed in the center of the screen. Select the **Test Type** tab. Enter information about wafer size and the desired test pattern.
6.3.4.4 Select the **Measurement Type** tab. From this page you can set up the measurement. It possible to measure a single layer, a layer on top of one layer or a layer on top of two layers. If using multiple layers you will have to enter data about the under laying layers.
6.3.4.5 To set up a single layer measurement, select **Layer1-Film**. A screen will come up where you may select an appropriate film.
6.3.4.6 Press **F1** select.
6.3.4.7 Select the substrate field and press **F4** Toggle Active to select your substrate.
6.3.4.8 Under **Card Index** select **Test Results**. On the index cards in the center of the screen set up how you want the data to be displayed.
6.3.4.9 When your changes are complete, press **F6 Update**.
6.3.4.10 Press F8 Folder Select to get back to the previous menu.

6.3.5 Setting up Film Constants for new films

6.3.5.1 From the **Main Engineering Menu** select **Test Development** in the **Menu** box and **Film Constants** under **Item** and press **F1 Select**.

6.3.5.2 For a new film select a blank spot and fill in the proper coefficients.

6.3.6 Calibrating the System

6.3.6.1 Calibration of the machine is only necessary once every two weeks, when system maintenance has been performed or when a new type of substrate is being used.
6.3.6.2 When performing a calibration of the system, the same type of wafer that you will be measuring should be used. For example a 4 or 6 inch blank silicon wafer. (or blank aluminum wafer if you will be measuring a film deposited on top of aluminum) The system *does* store the values.
6.3.6.3 From the **Main Engineering** menu, select **Test Development** from the **Menu** window and **Substrate Constants** from the **Item** window and press **F1** select.
6.3.6.4 Press **F1 Substrate Calib**.
6.3.6.5 Highlight the calibration field to be used and press **F1** to start the calibration.
6.3.6.6 After the wafer is calibrated press **F6** to **Update**.
6.3.6.7 Press **F8** to return.

6.4 Errors during Run

7 APPROPRIATE USES OF THE TOOL

7.1 This tool is intended for wafers only. Do not use other substrates.
7.2 Do not save un-necessary files or recipes due to storage constraints.

REVISION RECORD

Summary of Changes	Originator	Rev/Date
Original Issue	Sean O'Brien	A-04/14/04
Replaced floppy drive with USB	Bruce Tolleson	B-07/30/14
